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(54) CULTURE MEDIUM FOR MICROORGANISM OBTAINED FROM RESIDUAL LIQUID OF DISTILLATION OF SHOCHU (JAPANESE WHITE DISTILLED LIQUOR), AND ITS PRODUCTION

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain a culture medium for microorganisms obtained from a residual liquid of distillation of shochu, containing extremely small amount of water-insoluble component and coloring component, and excellent in proliferation-promoting activities, and further to provide the production method thereof.

SOLUTION: This culture medium contains a dried product obtained by subjecting the residual liquid by-produced in the shochu-production using barley as a raw material and obtained by distilling the shochu to a solid-liquid separation to provide a liquid component, filtering the obtained liquid component to provide a clear liquid, concentrating the obtained clear liquid to provide a concentrated liquid, subjecting the concentrated liquid to absorption treatment by using a synthetic absorbent to provide an unabsorbed fraction, and drying the obtained unabsorbed fraction, as an active ingredient. The production method is also provided.

CLAIMS

[Claim(s)]

[Claim 1] Carry out solid liquid separation of the shochu distillation residual liquor which sub** barley in white-distilled-liquor manufacture used as a raw material, and a part for a fluid is obtained, A culture medium for microorganisms containing a dry matter which filters a part for this fluid, obtains clear liquid, condenses this clear liquid, obtains a concentrate, gives this concentrate to adsorption treatment using a synthetic adsorbent material, obtains a non-adsorptivity fraction, and is obtained by drying this non-adsorptivity fraction as an active principle.

[Claim 2] The culture medium for microorganisms according to claim 1 in which said microorganisms are yeast, lactic acid bacteria, and lactobacillus bifidus.

[Claim 3] The 1st process of carrying out solid liquid separation of the shochu distillation residual liquor which sub** barley in white-distilled-liquor manufacture used as a raw material, and obtaining a part for a fluid, A manufacturing method of a culture medium for microorganisms including the 2nd process of filtering a part for this fluid and obtaining clear liquid, the 3rd process of condensing this clear liquid and obtaining a concentrate, the 4th process of giving this concentrate to adsorption treatment using a synthetic adsorbent material, and obtaining a non-adsorptivity fraction, and the 5th process of drying this non-adsorptivity fraction.

[Claim 4] A manufacturing method of the culture medium for microorganisms according to claim 3 which has further the process of neutralizing clear liquid obtained at said 2nd process, or a concentrate obtained at said 3rd process.

[Claim 5] A manufacturing method of the culture medium for microorganisms according to claim 3 or 4 in which said synthetic adsorbent material is what is chosen from among an aromatic system synthetic adsorbent material, an aromatic system qualified type synthetic adsorbent material, and an methacrylic system synthetic adsorbent material.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to a culture medium for microorganisms obtained from the shochu distillation residual liquor which sub** by white-distilled-liquor manufacture, and a manufacturing method for the same. Carry out solid liquid separation of the shochu distillation residual liquor which sub** barley in the white-distilled-liquor manufacture used as a raw material by this invention in more detail, and a part for a fluid is obtained, A part for this fluid is filtered, clear liquid is obtained, this clear liquid is condensed, a concentrate is obtained, this concentrate is given to the adsorption treatment using a synthetic adsorbent material, a non-adsorptivity fraction is obtained, and this non-adsorptivity fraction is dried. Therefore, it is related with a culture medium for microorganisms containing the dry matter obtained as an active principle, and a manufacturing method for the same.

[0002]

[Description of the Prior Art] As for most, although the shochu distillation residual liquor which sub** in white-distilled-liquor manufacture may be partly used as a ration for livestock or manure, it is common to lay on the shelf by sea dumping, ground reduction, incineration disposal, etc. Although sea dumping is a cheap disposal method of shochu distillation residual liquor, it is to be legally regulated by rise of a global environmental problem and to carry out the blanket ban of it. Ground reduction also has a problem which pollutes groundwater and a river, and incineration processing has problems, such as cost and a dioxin generation. From such a thing, it sets in many fields now and effective use of shochu distillation residual liquor is considered. The method of using shochu distillation residual liquor as feed or manure until now, as mentioned above, etc. are proposed.

[0003] Use to the culture medium for microorganisms of shochu distillation residual liquor other than an above-mentioned proposal is proposed. For example, to JP,8-308590,A (henceforth the literature 1), when manufacturing Polly gamma-glutamic acid, using shochu distillation residual liquor as a culture medium of Polly gamma-glutamic-acid production soil bacteria is indicated. Generally, in the literature 1, shochu distillation residual liquor uses shochu distillation residual liquor as a glutamic-acid supply source for Polly gamma-glutamic-acid production in view of 0.1-2 g/L of glutamic acid being included. The supernatant liquid (pH 3.8) produced by giving the shochu distillation residual liquor specifically produced by performing solid liquid separation to solid liquid separation is adjusted the pH to 6.5 with sodium hydroxide solution, and this is used as a culture medium as it is. However, preservability is very bad, when it uses as a culture medium as it is after neutralizing the supernatant liquid of shochu

distillation residual liquor as a rotten advance is describing in the literature 1 early since the BOD of shochu distillation residual liquor is moreover very as high as 70000 - 100000 mg/L, including moisture about 90%. The supernatant liquid of the shochu distillation residual liquor concerned contains many insoluble in water nature ingredients, and is SS (suspended solid: in those for the solid particles currently distributed underwater) further. Since what remains in the eye of a filter paper with the diameter of 2 mm or less is contained, when this is used as a culture medium for microorganisms, measurement of the cell mass concentration under culture and recovery of the biomass after the end of culture are difficult. Therefore, it is not desirable from becoming a cause which lowers the value as a culture medium remarkably. In addition, since the supernatant liquid of the shochu distillation residual liquor concerned also contains many coloring components which are not desirable as a medium component, when using the culture medium for microorganisms having contained the coloring component as it is, measurement of the cell mass concentration under culture not only becomes difficult, but the biomass obtained after the end of culture will be colored. This will lower the value as a culture medium remarkably.

[0004]By the way, in JP,8-56584,A (henceforth the literature 2), one of this invention persons has proposed the method of manufacturing feed from shochu distillation residual liquor, from a viewpoint of using shochu distillation residual liquor effectively. In the literature 2, solid liquid separation of the shochu distillation residual liquor is carried out, and it divides into a part for a part for a fluid, and a solid, and is SS for this fluid (suspended solid: in those for the solid particles currently distributed underwater). The method of manufacturing feed is indicated by by mixing the dry matter for said fluid dried to predetermined moisture after adjusting the quantity of what remains in the eye of a filter paper with the diameter of 2 mm or less to 100 g/L or less, and the dry matter for said solid dried with the option.

[0005]When this invention persons used the feed obtained in the literature 2 as culture media for microorganisms, such as yeast, as it was, it became clear that there were the following problems. That is, since there were many insoluble in water nature ingredients since the feed concerned is mixing the solid part dry matter, and there were also still more coloring components, it turned out that it is not suitable for use as a culture medium for microorganisms as it was. When the dry matter for said fluid was used as culture media for microorganisms, such as yeast, as it was, similarly there were many insoluble in water nature ingredients and coloring components, and it turned out that it is not suitable for use as a culture medium for microorganisms as it was.

[0006]

[Problem(s) to be Solved by the Invention]As stated above, in the literature 1, in sodium hydroxide solution, adjust [the pH to 6.5] the supernatant liquid of the shochu distillation residual liquor which performed solid liquid separation, and use it as a culture medium, but. In

this case, since the culture medium concerned is a fluid, preservability is bad and contains further an insoluble in water nature ingredient and SS, and the coloring component that is not still more desirable as a medium component, and these have the problem of lowering the value as a culture medium remarkably. Since an insoluble in water nature ingredient and SS, and the coloring component that is not still more desirable as a medium component are contained as mentioned above when the feed indicated in the literature 2 or the dry matter for a fluid is used as a culture medium for microorganisms as it was, it is not suitable for use as a culture medium for microorganisms as it is. When these problems advance effective use to the culture medium for microorganisms of shochu distillation residual liquor, they are problems which require solution immediately.

[0007]This invention results in completion in view of the problem in the conventional technology mentioned above as a result of the further research. The main purpose of this invention solves the above-mentioned problem in the conventional technology concerning the culture-medium manufacture for microorganisms from shochu distillation residual liquor, and from shochu distillation residual liquor. There are very few insoluble in water nature ingredients and coloring components, and when this is used as a culture medium for microorganisms, there is quantity of the culture object acquired in providing a culture medium for microorganisms which increases remarkably, and a manufacturing method for the same.

[0008]

[Means for Solving the Problem]When there are very few insoluble in water nature ingredients and coloring components and they use as a culture medium for microorganisms from a viewpoint [this invention persons solve a problem in culture-medium manufacture for microorganisms from shochu distillation residual liquor mentioned above, and] of using shochu distillation residual liquor more effectively, Quantity of a culture object acquired repeated research wholeheartedly via an experiment for the purpose of obtaining a culture medium for microorganisms which increases remarkably. As a result, carry out solid liquid separation of the shochu distillation residual liquor which sub** barley in white-distilled-liquor manufacture used as a raw material, and a part for a fluid is obtained, By filtering a part for this fluid, obtaining clear liquid, condensing this clear liquid, obtaining a concentrate, giving this concentrate to adsorption treatment using a synthetic adsorbent material, obtaining a non-adsorptivity fraction, and drying this non-adsorptivity fraction, There were very few insoluble in water nature ingredients and coloring components, when this was used as a culture medium for microorganisms, a culture medium for microorganisms which quantity of a culture object acquired increases remarkably was obtained, and it became clear that an aforementioned problem was solved. This invention is based on this fact that became clear.

[0009]Although a desirable mode of this invention is described below, this invention is not restricted at all by these. The 1st process of a culture medium for microorganisms of this

invention carrying out solid liquid separation of the shochu distillation residual liquor which sub** barley in white-distilled-liquor manufacture used as a raw material as shown in drawing 1, and obtaining a part for a fluid, It is obtained by the 2nd process of filtering a part for this fluid and obtaining clear liquid, the 3rd process of condensing this clear liquid and obtaining a concentrate, the 4th process of giving this concentrate to adsorption treatment using a synthetic adsorbent material, and obtaining a non-adsorptivity fraction, and the 5th process of drying this obtained non-adsorptivity fraction. When manufacturing a culture medium for microorganisms of this invention below, shochu distillation residual liquor used as a raw material and each process are explained in full detail.

[0010]Shochu distillation residual liquor said in this invention manufactures barley koji and steamed malt by using barley or cleaning barley as a raw material, Starch contained in obtained barley koji and steamed malt is saccharified using koji and/or an enzyme agent, When distilling white-distilled-liquor aging mash obtained by performing alcoholic fermentation by yeast furthermore and obtaining white-distilled-liquor aging mash using simplex distillation apparatuses, such as distillation under reduced pressure or atmospheric distillation, what sub** as a vinasse is meant, and distillation residue liquid of barley white distilled liquor is mentioned typically. Furthermore, also in manufacture of the U.S. white distilled liquor, sweet potato white distilled liquor, and side white distilled liquor, when using barley as some raw materials in these white-distilled-liquor manufactures, it is included by shochu distillation residual liquor which also says shochu distillation residual liquor which sub** in this invention.

[0011]In this invention, the 1st process of carrying out solid liquid separation of the shochu distillation residual liquor obtained by a distillation process of white-distilled-liquor manufacture, and obtaining a part for a fluid removes raw material barley, or a fermentation residue and a yeast cell body of insoluble in water nature of koji origin from shochu distillation residual liquor, and performs them for the purpose of obtaining a part for a fluid. In this 1st process, it can generally carry out using a solid-liquid-separation machine of a screw press method, a roller press method, or a filtration squeezing type. In this way, the 2nd process of filtering a part for this fluid obtained at the 1st process, and obtaining clear liquid is performed for the purpose of removing SS contained in a part for this fluid still mostly, and obtaining clear liquid. In filtration processing of the 2nd process, it can carry out using various kinds of centrifuges, diatomite filters, ceramic filters, or filtration squeezers.

[0012]In this invention, the 3rd process of condensing clear liquid obtained at the 2nd process, and obtaining a concentrate is carried out for the purpose of raising concentration of clear liquid given to adsorption treatment in the 4th following process. A publicly known method can be used for a condensation method of clear liquid of this 3rd process, and, specifically, it can carry out using a vacuum concentration device, a vacuum evaporator, etc.

[0013]The 4th process of giving this concentrate obtained at the 3rd process to adsorption

treatment using a synthetic adsorbent material, and obtaining a non-adsorptivity fraction is performed for the purpose of removing a coloring component which is not desirable as a medium component contained in this concentrate. If a coloring component exists so much in culture medium, since measurement of cell mass concentration under culture not only becomes difficult, but a biomass obtained after an end of culture will be colored, value as a culture medium will be lowered remarkably. As a synthetic adsorbent material used at the 4th process, a synthetic adsorbent material of an aromatic system, an aromatic system qualified type, and an methacrylic system can be used. For example, as a thing suitable as a synthetic adsorbent material, Mitsubishi Chemical 850 [SEPABIZUSP] and diagram ion HP20, and Amberlite XAD16 grade further by ORGANO CORP. can be used.

[0014]The 5th process of drying a non-adsorptivity fraction obtained at the 4th process can be performed using dryers, such as a disk type dryer, a drum-type dryer, and a spray type dryer, or a freeze dryer as a method of drying this non-adsorptivity fraction.

[0015]By the way, about a culture medium for growth of a microorganism, there is the optimal pH for each microorganism and, as for a culture medium for bacteria, it is common to adjust a culture medium pH 6.8-7.2 and for mold and yeast to pH 5.0-6.0. Since shochu distillation residual liquor contains citrate of aspergillus origin, it is as low as 3-4, and when this is used as a medium raw material as it was, a pH value of an obtained culture medium becomes quite low, and is not more preferred [the pH] than a pH value generally made ideal for culture of a microorganism. Therefore, also in this invention, it is desirable to carry out neutralization processing of clear liquid obtained at the 2nd process or the concentrate obtained at the 3rd process using a suitable neutralizer. Sodium hydroxide/potassium hydrate can be used as such a neutralizer.

[0016]In the 5th process of drying this non-adsorptivity fraction obtained at the 4th process, In order to attain equalization of particles of a culture-medium dry matter for microorganisms, an excipient can also be added to this non-adsorptivity fraction before desiccation, and when obtaining a powdered product by spray drying, an excipient generally used can be used as such an excipient. As a desirable example, starch, such as dextrin, such as calcining dextrin and enzyme denaturation dextrin, or etherification starch, and acid treatment starch, can be mentioned.

[0017]Especially a culture medium for microorganisms of this invention can be used as substitution of nitrogen sources, such as a yeast extract, casein peptone, and a meat extract, when cultivating a biomass of yeast, lactic acid bacteria, and lactobacillus bifidus. In this case, quantity of a culture object which raises a proliferation rate of a culture object and a culture medium for microorganisms of this invention is not only used as a nitrogen source, but is acquired as a result increases remarkably. In addition, when especially a culture medium for microorganisms of this invention cultivates a biomass of yeast, lactic acid bacteria, and

lactobacillus bifidus, it can be added as a growth promoting substance to a culture medium which fully contains a nitrogen source. In this case, growth of a biomass is further promoted by culture medium for microorganisms of this invention, and a proliferation rate of a biomass is raised further and quantity of a culture object acquired increases remarkably like a case where it is the above again. Yeast of a Saccharomyces group can be mentioned as said yeast, As said lactic acid bacteria, Lactobacillus acidophilus of a Lactobacillus group, Lactobacillus plantarum, Lactobacillus fermentum, etc. can be mentioned, Furthermore as said lactobacillus bifidus, Bifidobacterium bifidum of a Bifidobacterium group, Bifidobacterium longum, etc. can be mentioned.

[0018]

[Embodiment of the Invention]

[Example] Although an example is given to below and this invention is concretely explained to it, this invention is not limited at all by these examples.

[0019]

[Acquisition of the shochu distillation residual liquor made from barley] The white distilled liquor made from barley was manufactured in order to present the following examples. The rate of preparation was carried out as shown in Table 1. Barley (70% cleaning) was used as a raw material. It cooled radiationally to 40 **, 1 kg per barley ton of seed malt (white koji bacillus) was inoculated, and 38 ** and RH95% performed it at 32 ** and RH92% in 20 hours after it carried out water absorption of the barley 40% (W/W) and manufacture of koji steamed it for 40 minutes for 24 hours. After it carried out water absorption of the barley 40% (W/W) and steamed malt steamed it for 40 minutes, it was added to primary preparation after radiational cooling to 40 **. In primary brewing, the primary mash obtained by adding 1 kg (wet weight) of culture objects of white-distilled-liquor yeast to the barley koji (3 t as barley) manufactured by the above-mentioned method as 3.6 kl of water and yeast, and obtaining primary mash was given to the fermentation (the 1st step of fermentation) for five days. Subsequently, in secondary brewing, 11.4 kl of water and the steamed malt (7 t as barley) manufactured by the above-mentioned method were added to the primary mash which finished the 1st above-mentioned step of fermentation, and the fermentation (the 2nd step of fermentation) for 11 days was given. The primary fermentation temperature was taught and was 25 ** also with secondary preparation. The secondary mash which finished the 2nd above-mentioned step of fermentation was given to simplex distillation with the conventional method, and 10 kl of white distilled liquor made from barley and 15 kl of shochu distillation residual liquor made from barley were obtained. The obtained shochu distillation residual liquor made from barley was used for the following examples.

[0020]

[Example 1] A part for the fluid obtained by carrying out solid liquid separation of said 1 kl of

shochu distillation residual liquor made from barley obtained by the distillation process of the white-distilled-liquor manufacture made from barley with the solid-liquid-separation machine of the screw press method made from Nobukazu Engineering the filtration squeezer further by Yabuta Industrial company. It used, a part for SS was separated further, and about 0.85 kl of clear liquid was obtained. Next, this clear liquid was condensed [three] in about 1/using the Ogawara Factory vacuum evaporator, and the concentrate was obtained. This obtained concentrate was contacted in the column filled up with Mitsubishi Chemical 850 [synthetic adsorbent material SEPABIZU SP], and the non-adsorptivity fraction which shows non-adsorptivity to the synthetic adsorbent material concerned eluted from the column concerned was obtained. The product spray type dryer made from Ogawara Chemical engineering machine is used for the obtained non-adsorptivity fraction, Inlet temperature 150 **, the outlet temperature of 80 **, amount ³ of 0.45 m / of hot winds, and min, and the volume of atomizing air Spray drying was carried out on condition of 1.0 kgf/cm², and about 10-kg powdered dry matter for culture media used for the culture medium for microorganisms was obtained.

[0021]

[Comparative example 1] Solid liquid separation of said 1 kl of shochu distillation residual liquor made from barley obtained by the distillation process of the white-distilled-liquor manufacture made from barley was carried out with the solid-liquid-separation machine of the screw press method made from Nobukazu Engineering, and a part for about 0.85-kl fluid was obtained. A part for this fluid was dried using Nishimura Steel Place disk type dryer, and about 70-kg dry matter was obtained. Nishimura Steel Place grinder ground this obtained dry matter, and the powdered dry matter for culture media used for the culture medium for microorganisms was obtained.

[0022]

[Evaluation]About the dry matter for culture media obtained by said Example 1 and said comparative example 1, those usefulness was evaluated via the following experiments.

[0023]

[Experiment 1] It is mentioned that there are few insoluble in water nature component amounts at the time of dissolving in water as fundamental conditions for which the culture medium for microorganisms is asked. If such an insoluble in water nature ingredient exists so much in culture medium, measurement of the cell mass concentration under culture and recovery of the biomass after the end of culture will become difficult, and will lower the value as a culture medium remarkably. Then, the insoluble in water nature component amount at the time of dissolving them in water in the following experiments 1 about the dry matter for culture media obtained by said Example 1 and said comparative example 1 was measured.

[0024]The dry matter 10g for culture media obtained in Example 1 was dissolved in 1 l. of 20 ** water, the obtained solution was centrifuged for 15 minutes at 8000 rpm after stirring, and a

0.05-g insoluble in water nature ingredient was obtained with wet weight. The solution which dissolved like this the dry matter 10g for culture media obtained by the comparative example 1 in 1 l. of 20 ** water, and was obtained after stirring was centrifuged for 15 minutes at 8000 rpm, and a 3.2-g insoluble in water nature ingredient was obtained with wet weight.

[0025]The result of the insoluble in water nature component amount obtained in the above-mentioned experiment 1 is shown in Table 2. 32% of the dry matters for culture media which the rate of the insoluble in water nature ingredient used in the case of the culture medium for microorganisms obtained by the comparative example 1 were reached so that clearly from the result shown in Table 2. On the other hand, they were only 0.5% or less of the dry matters for culture media which use the rate of an insoluble in water nature ingredient in the case of said culture medium for microorganisms obtained in Example 1 of this invention. The insoluble in water nature ingredient contained in the dry matter for culture media obtained in Example 1 of this invention from the above thing was 1/60 or less quantity of the insoluble in water nature ingredient contained in the dry matter for culture media obtained by the comparative example 1. That is, the dry matter for culture media obtained by this invention became not producing a problem at all and clear [having the character which was extremely suitable for microbial cultivation] in the case of recovery of the biomass after measurement of the cell mass concentration under culture, or the end of culture.

[0026]

[Experiment 2] It is mentioned that there are few amounts of coloring components at the time of dissolving in water as fundamental conditions for which the culture medium for microorganisms is asked. The coloring component is unnecessary as a medium component, and if these coloring components exist so much in a culture medium, measurement of the cell mass concentration under culture not only becomes difficult, but the biomass obtained after the end of culture will be colored. For this reason, the value as a culture medium will be lowered remarkably. Then, in the following experiments 2, evaluation about the coloring component of the dry matter for culture media obtained by said Example 1 and said comparative example 1 was performed.

[0027]About the supernatant liquid obtained by centrifuging each solution obtained in the above-mentioned experiment 1, and obtaining supernatant liquid, visual observation of the color of this supernatant liquid was carried out, and the absorbance at 430 nm of this supernatant liquid and 480 nm was further measured using the absorptiometer. The result of each solution investigated in the experiment 2 is shown in Table 3. As a result of carrying out visual observation of the color about the supernatant liquid of each solution so that clearly from the result shown in Table 3, the supernatant liquid of the solution obtained in Example 1 of this invention assumed colorlessness, and coloring was not accepted. It was clear that the supernatant liquid of the solution obtained by the comparative example 1 assumes seal brown

on the other hand, and the coloring component is contained so much. As a result of measuring the absorbance of 430 nm and 480 nm about the supernatant liquid of each solution so that clearly from the result shown in Table 3, the supernatant liquid of the solution obtained in Example 1 of this invention showed the very low absorbance as compared with the supernatant liquid of the solution obtained by the comparative example 1.

[0028] Furthermore in the following the experiments 3 and the experiments 4, evaluation about those coloring components was performed about each freeze-drying thing of the non-adsorptivity fraction which attached and obtained the clear liquid obtained in said Example 1, and this clear liquid to the adsorption treatment using a synthetic adsorbent material.

[Experiment 3] The weight of each freeze-drying thing of the non-adsorptivity fraction which attached and obtained the clear liquid obtained in the above-mentioned Example 1 and this clear liquid to the adsorption treatment using a synthetic adsorbent material obtained by freeze-drying 1 l., respectively was measured. As a result, from 1 l. of non-adsorptivity fractions, a 25.7-g freeze-drying thing was obtained from this 1 l. of clear liquid to a 28.1-g freeze-drying thing having been obtained. By giving clear liquid to the adsorption treatment using a synthetic adsorbent material from this, and obtaining a non-adsorptivity fraction showed that a 2.4 g [per this l. of clear liquid] unnecessary coloring component could be removed.

[0029]

[Experiment 4] The following experiments 4 were conducted independently. That is, the color of the culture yeast biomass obtained by doing the culture examination of yeast was evaluated using the dry matter for culture media obtained in the above-mentioned Example 1, and the dry matter for culture media which obtained it by carrying out spray drying of this concentrate in the above-mentioned Example 1 as it is without giving the adsorption treatment using a synthetic adsorbent material.

[The culture examination by the culture medium of this invention] The dry matter 30g for culture media obtained in the above-mentioned Example 1, Dissolve the grape sugar 32.5g, the ammonium carbonate 8.5g, 2 g of ammonium phosphate, the magnesium sulfate 0.3g, and the 50% lactic acid 27.5g in 1 l. of water, inoculate commercial white-distilled-liquor yeast after adjusting the pH to 4.5, and aerobic fermentation is carried out at 30 °C for 40 hours, The obtained culture medium was centrifuged for 15 minutes at 10000 rpm. As a result, the yeast cell body with a wet weight of 36.2 g which assumes the original white of this yeast cell body was obtained.

[The culture examination by the culture medium of contrast] Without giving this concentrate in the above-mentioned Example 1 to the adsorption treatment using a synthetic adsorbent material as it is. Spray drying is carried out. Dissolve the obtained dry matter 30g for culture media, the grape sugar 32.5g, the ammonium carbonate 8.5g, 2 g of ammonium phosphate,

the magnesium sulfate 0.3g, and the 50% lactic acid 27.5g in 1 l. of water, inoculate commercial white-distilled-liquor yeast after adjusting the pH to 4.5, and aerobic fermentation is carried out at 30 °C for 40 hours, The obtained culture medium was centrifuged for 15 minutes at 10000 rpm. As a result, the yeast cell body with a wet weight of 32.5 g which assumed different brown from the original white of this yeast cell body was obtained. Also in the culture object acquired from the above thing by not producing a problem at all in the case of measurement of the cell mass concentration under culture since the culture medium for microorganisms by this invention has the very low content of a coloring component, coloring became clear [having the character which was extremely suitable for the microbial cultivation hardly accepted].

[0030]

[Experiment 5] Using the dry matter for culture media obtained in said Example 1, and the blackstrap molasses generally used from the former, the culture examination of yeast was done and the culture medium for microorganisms obtained by this invention was evaluated.

[0031]

[The culture examination by the culture medium of this invention] Dissolve in 1 l. of water and the dry matter 30g for culture media obtained in Example 1, the grape sugar 32.5g, the ammonium carbonate 8.5g, 2 g of ammonium phosphate, the magnesium sulfate 0.3g, and the 50% lactic acid 27.5g commercial white-distilled-liquor yeast after adjusting the pH to 4.5. It inoculated and the culture medium obtained by carrying out aerobic fermentation for 40 hours at 30 °C was centrifuged for 15 minutes at 10000 rpm. As a result, a 37.5-g biomass was obtained with wet weight.

[The culture examination by the culture medium of contrast] Dissolve the blackstrap molasses 50g, the grape sugar 32.5g, the ammonium carbonate 8.5g, 2 g of ammonium phosphate, the magnesium sulfate 0.3g, and the 50% lactic acid 27.5g in 1 l. of water, inoculate commercial white-distilled-liquor yeast after adjusting the pH to 4.5, and aerobic fermentation is carried out at 30 °C for 40 hours, The obtained culture medium was centrifuged for 15 minutes at 10000 rpm, and a 28.0-g biomass was obtained with wet weight.

[0032]The result of the yeast culture examination investigated in the experiment 5 is shown in Table 4. The wet weight of the yeast cell body at the time of using the dry matter for culture media obtained in Example 1 of this invention reached 1.34 times at the time of using the blackstrap molasses of contrast so that clearly from the result shown in Table 4. It turned out that the wet weight of the yeast cell body at the time of using the dry matter for culture media obtained in Example 1 of this invention when per culture-medium addition compared this result reaches 2.23 times at the time of using the blackstrap molasses of contrast. When the wet weight of the yeast cell body under culture was investigated temporally and the dry matter for culture media obtained in Example 1 of this invention was used, in the 30th hour, it turned out

after the culture start that the almost same biomass wet weight as the time of the end of culture at the time of already using the blackstrap molasses of contrast (the 40th hour) is reached. It became clear from this that a desired yeast cell body is obtained by culture days shorter than before by using the culture medium for microorganisms obtained from the shochu distillation residual liquor of this invention.

[0033]

[Experiment 6] Using the dry matter for culture media obtained in said Example 1, and the yeast extract for culture media generally used from the former, the culture examination of lactic acid bacteria was done and the culture medium for microorganisms obtained by this invention was evaluated.

[0034]

[The culture examination by the culture medium of this invention] The dry matter 5g for culture media, the grape sugar 10g, the poly peptone 5g, and 5 g of sodium chloride which were obtained in Example 1 are dissolved in 1 l. of water, and it is Lactobacillus after adjusting the pH to 7. Inoculate acid philus IFO13951^T and it cultivates at 30 ** for 40 hours, The obtained culture medium was centrifuged for 15 minutes at 10000 rpm. As a result, a 41.5-g biomass was obtained with wet weight.

[The culture examination by the culture medium of contrast] Dissolve the yeast extract 5g for culture media, the grape sugar 10g, the poly peptone 5g, and 5 g of sodium chloride in 1 l. of water, inoculate Lactobacillus acid philus IFO13951^T after adjusting the pH to 7, and it cultivates at 30 degrees for 40 hours, The obtained culture medium was centrifuged for 15 minutes at 10000 rpm, and a 29.4-g biomass was obtained with wet weight.

[0035]The result of the lactic-acid-bacteria culture examination investigated in the experiment 6 is shown in Table 5. The wet weight of the lactic-acid-bacteria biomass at the time of using the dry matter for culture media obtained in Example 1 of this invention reached 1.41 times in the contrast which used the yeast extract for culture media so that clearly from the result shown in Table 5. When the wet weight of the lactic-acid-bacteria biomass under culture was investigated temporally and the dry matter for culture media obtained in Example 1 of this invention is used, In the 28th hour, it turned out after the culture start that the almost same biomass wet weight as the time of the end of culture in the contrast using the yeast extract for culture media (the 40th hour) is already reached. It became clear from this that a desired lactic-acid-bacteria biomass is obtained by culture days shorter than before by using the culture medium for microorganisms obtained from the shochu distillation residual liquor of this invention.

[0036]

[Experiment 7] It added 1% to the contrast culture medium for lactic-acid-bacteria culture which uses the dry matter for culture media obtained in said Example 1 in the case of the

conventional lactic-acid-bacteria culture, the culture examination of lactic acid bacteria was done, and evaluation as a lactic-acid-bacteria growth promoting substance of the dry matter for culture media obtained by this invention was performed.

[0037]

[The culture examination by a contrast culture medium] The yeast extract 5g for culture media, the grape sugar 10g, the poly peptone 5g, and 5 g of sodium chloride were dissolved in 1 l. of water, and three culture media were produced by the technique adjusted the pH to 7.

Lactobacillus Plan TARAMUIFO3070, Lactobacillus Acid philus IFO13951^T and Lactobacillus Each of fur mentum IFO3071 was individually inoculated into one of said the culture media, and it cultivated at 30 ** for 40 hours. This obtained three culture medium. Each of three obtained culture medium was centrifuged for 15 minutes at 10000 rpm. Thus, the culture object was acquired about each of three kinds of said lactic acid bacteria.

[The culture examination which added the culture medium of this invention 1% to the contrast culture medium] The dry matter 10g for culture media, the yeast extract 5g for culture media, the grape sugar 10g, the poly peptone 5g, and 5 g of sodium chloride which were obtained in Example 1 were dissolved in 1 l. of water, and three culture media were produced by the technique adjusted the pH to 7. Lactobacillus Plan TARAMUIFO3070, Lactobacillus Acid philus IFO13951^T and Lactobacillus Each of fur mentum IFO3071 was individually inoculated into one of said the culture media, and it cultivated at 30 ** for 40 hours. This obtained three culture medium. Each of three obtained culture medium was centrifuged for 15 minutes at 10000 rpm. Thus, the culture object was acquired about each of three kinds of said lactic acid bacteria.

[0038]As a result, by adding the dry matter for culture media obtained by said contrast culture medium in Example 1 of this invention 1% showed that growth of each above-mentioned lactic acid bacteria was promoted remarkably. By specifically adding the dry matter for culture media obtained by said contrast culture medium in Example 1 of this invention 1%, The biomass wet weight of lactic acid bacteria is Lactobacillus. In plan TARAMUIFO3070, 3.13 times of a contrast culture medium, Lactobacillus At acid philus IFO13951^T, they are 2.58 times of a contrast culture medium, and Lactobacillus. In fur mentum IFO3071, it reached by 2.67 times the contrast culture medium. It turned out that the culture medium for microorganisms obtained from this by this invention also has a proliferative effect of outstanding lactic acid bacteria.

[0039]

[Experiment 8] Using the dry matter for culture media obtained in said Example 1, and the yeast extract for culture media generally used from the former, the culture examination of lactobacillus bifidus was done and the culture medium for microorganisms obtained by this invention was evaluated.

[0040]

[The culture examination by the culture medium of this invention] The dry matter 10g for culture media, the grape sugar 10g, the casein peptone 10g, the meat extract 5g, the dibasic potassium phosphate 3g, L-cysteine hydrochloride 0.5g and the sodium ascorbate 10g which were obtained in Example 1, and 1-ml surface-active agent Tween80 (brand name). It dissolves in 1 l. of water, and is the Bifidobacterium after adjusting the pH to 7. BIFIDAMU JCM1254 was inoculated, the culture medium obtained by cultivating for 48 hours at 37 ** was centrifuged for 15 minutes at 10000 rpm, and the lactobacillus bifidus biomass was obtained.

[The culture examination by the culture medium of contrast] The yeast extract 5g for culture media, the grape sugar 10g, the casein peptone 10g, the meat extract 5g, the dibasic potassium phosphate 3g, L-cysteine hydrochloride 0.5g, the sodium ascorbate 10g, and 1-ml surface-active agent Tween80 (brand name). It dissolves in 1 l. of water, and is the Bifidobacterium after adjusting the pH to 7. BIFIDAMU JCM1254 was inoculated, the culture medium obtained by cultivating for 48 hours at 37 ** was centrifuged for 15 minutes at 10000 rpm, and the lactobacillus bifidus biomass was obtained.

[0041]As a result, the wet weight of the lactobacillus bifidus biomass at the time of using the dry matter for culture media obtained in Example 1 of this invention, when the wet weight of the lactobacillus bifidus biomass obtained in each culture examination was measured reached 1.63 times in the contrast which used the yeast extract for culture media. When the wet weight of the lactobacillus bifidus biomass under culture was investigated temporally and the dry matter for culture media obtained in Example 1 of this invention is used, In the 35th hour, it turned out after the culture start that the almost same biomass wet weight as the time of the end of culture in the contrast using the yeast extract for culture media (the 48th hour) is already reached. It became clear from this that a desired lactobacillus bifidus biomass is obtained by culture days shorter than before by using the culture medium for microorganisms obtained from the shochu distillation residual liquor of this invention.

[0042]

[Example 2] A part for the fluid obtained by separating solid-liquid with the solid-liquid-separation machine of the screw press method made from Nobukazu Engineering in said 1 kl of shochu distillation residual liquor made from barley obtained by the distillation process of the white-distilled-liquor manufacture made from barley further the Tomoe Engineering decanter type centrifuge. A part for SS was further separated for a part for the fluid obtained by using and separating solid-liquid using the ceramic filtration apparatus further by Japanese Schumacher, about 0.85 kl of clear liquid was obtained, the clear liquid concerned was neutralized by sodium hydroxide, and about 0.9 kl of neutralization liquid was obtained. Next, condense the neutralization liquid concerned up to about 3 times using the Ogawara Factory vacuum evaporator, and a concentrate is obtained, The obtained concentrate concerned is

contacted in the column filled up with Mitsubishi Chemical 850 [synthetic adsorbent material SEPABIZU SP], The non-adsorptivity fraction which shows non-adsorptivity to the synthetic adsorbent material concerned eluted from the packed column concerned is obtained, The product spray type dryer made from Ogawara Chemical engineering machine is used for the obtained non-adsorptivity fraction, Inlet temperature 150 **, the outlet temperature of 80 **, amount ³ of 0.45 m / of hot winds, and min, and the volume of atomizing air Spray drying was carried out on condition of 1.0 kgf / cm², and about 8-kg dry matter for culture media used for the culture medium for microorganisms was obtained.

[0043]

[Experiment 9] Using the dry matter for culture media obtained in said Example 2, and the yeast extract for culture media generally used from the former, the culture examination of lactic acid bacteria was done and the culture medium for microorganisms obtained by this invention was evaluated.

[0044]

[The culture examination by the culture medium of this invention] The dry matter 5g for culture media, the grape sugar 10g, the poly peptone 5g, and 5 g of sodium chloride which were obtained in Example 2 are dissolved in 1 l. of water, and it is Lactobacillus after adjusting the pH to 7. Inoculate acid philus IFO13951^T and it cultivates at 30 ** for 40 hours, The obtained culture medium was centrifuged for 15 minutes at 10000 rpm. As a result, a 45.3-g biomass was obtained with wet weight.

[The culture examination by the culture medium of contrast] Dissolve the yeast extract 5g for culture media, the grape sugar 10g, the poly peptone 5g, and 5 g of sodium chloride in 1 l. of water, inoculate Lactobacillus acid philus IFO13951^T after adjusting the pH to 7, and it cultivates at 30 degrees for 40 hours, The obtained culture medium was centrifuged for 15 minutes at 10000 rpm, and a 29.7-g biomass was obtained with wet weight.

[0045]The result of the lactic-acid-bacteria culture examination investigated in the experiment 9 is shown in Table 6. The wet weight of the lactic-acid-bacteria biomass at the time of using the dry matter for culture media obtained in Example 2 of this invention reached 1.53 times in the contrast which used the yeast extract for culture media so that clearly from the result shown in Table 6. When the wet weight of the lactic-acid-bacteria biomass under culture was investigated temporally and the dry matter for culture media obtained in Example 2 of this invention is used, In the 28th hour, it turned out after the culture start that the almost same biomass wet weight as the time of the end of culture in the contrast using the yeast extract for culture media (the 40th hour) is already reached. It became clear from this that a desired lactic-acid-bacteria biomass is obtained by culture days shorter than before by using the culture medium for microorganisms obtained from the shochu distillation residual liquor of this

invention.

[0046]

[Experiment 10] Using the dry matter for culture media obtained in said Example 2, and the yeast extract for culture media generally used from the former, the culture examination of lactobacillus bifidus was done and the culture medium for microorganisms obtained by this invention was evaluated.

[0047]

[The culture examination by the culture medium of this invention] The dry matter 10g for culture media, the grape sugar 10g, the casein peptone 10g, the meat extract 5g, the dibasic potassium phosphate 3g, L-cysteine hydrochloride 0.5g and the sodium ascorbate 10g which were obtained in Example 2, and 1-ml surface-active agent Tween80 (brand name). It dissolves in 1 l. of water, and is the Bifidobacterium after adjusting the pH to 7. BIFIDAMU JCM1254 was inoculated, the culture medium obtained by cultivating for 48 hours at 37 ** was centrifuged for 15 minutes at 10000 rpm, and the lactobacillus bifidus biomass was obtained.

[The culture examination by the culture medium of contrast] The yeast extract 5g for culture media, the grape sugar 10g, the casein peptone 10g, the meat extract 5g, the dibasic potassium phosphate 3g, L-cysteine hydrochloride 0.5g, the sodium ascorbate 10g, and 1-ml surface-active agent Tween80 (brand name). It dissolves in 1 l. of water, and is the Bifidobacterium after adjusting the pH to 7. BIFIDAMU JCM1254 was inoculated, the culture medium obtained by cultivating for 48 hours at 37 ** was centrifuged for 15 minutes at 10000 rpm, and the lactobacillus bifidus biomass was obtained.

[0048]As a result, the wet weight of the lactobacillus bifidus biomass at the time of using the dry matter for culture media obtained in Example 2 of this invention, when the wet weight of the lactobacillus bifidus biomass obtained in each culture examination was measured reached 1.81 times in the contrast which used the yeast extract for culture media. When the wet weight of the lactobacillus bifidus biomass under culture was investigated temporally and the dry matter for culture media obtained in Example 2 of this invention is used, In the 35th hour, it turned out after the culture start that the almost same biomass wet weight as the time of the end of culture in the contrast using the yeast extract for culture media (the 48th hour) is already reached. It became clear from this that a desired lactobacillus bifidus biomass is obtained by culture days shorter than before by using the culture medium for microorganisms obtained from the shochu distillation residual liquor of this invention.

[0049]

[Example 3] A part for the fluid obtained by separating solid-liquid with the solid-liquid-separation machine of the screw press method made from Nobukazu Engineering in said 1 kl of shochu distillation residual liquor made from barley obtained by the distillation process of the white-distilled-liquor manufacture made from barley further the Tomoe Engineering decanter

type centrifuge. It used, solid-liquid was separated and a part for about 0.85-kl fluid was obtained. Next, condense [three] a part for the fluid concerned in about 1/using the Ogawara Factory vacuum evaporator, and a concentrate is obtained, The obtained concentrate concerned is contacted in the column filled up with Mitsubishi Chemical 850 [synthetic adsorbent material SEPABIZU SP], The non-adsorptivity fraction which shows non-adsorptivity to the synthetic adsorbent material concerned eluted from the packed column concerned is obtained, They are extractives to the obtained non-adsorptivity fraction. 1.5-times the amount dextrin friend call for the product foodstuffs addition made from Japanese Dregs Chemicals The product spray type dryer made from Ogawara Chemical engineering machine is used for 6-L after addition, Inlet temperature 150 **, the outlet temperature of 80 **, amount ³ of 0.45 m / of hot winds, and min, and the volume of atomizing air Spray drying was carried out on condition of 1.0 kgf / cm², and about 12-kg dry matter used for the culture medium for microorganisms was obtained.

[0050]

[Experiment 11] Using the dry matter for culture media obtained in said Example 3, and the yeast extract for culture media generally used from the former, the culture examination of lactic acid bacteria was done and the culture medium for microorganisms obtained by this invention was evaluated.

[0051]

[The culture examination by the culture medium of this invention] The dry matter 5g for culture media, the grape sugar 10g, the poly peptone 5g, and 5 g of sodium chloride which were obtained in Example 3 are dissolved in 1 l. of water, and it is Lactobacillus after adjusting the pH to 7. Inoculate acid philus IFO13951 ^T and it cultivates at 30 ** for 40 hours, The obtained culture medium was centrifuged for 15 minutes at 10000 rpm. As a result, a 43.1-g biomass was obtained with wet weight.

[The culture examination by the culture medium of contrast] Dissolve the yeast extract 5g for culture media, the grape sugar 10g, the poly peptone 5g, and 5 g of sodium chloride in 1 l. of water, inoculate Lactobacillus acid philus IFO13951 ^T after adjusting the pH to 7, and it cultivates at 30 degrees for 40 hours, The obtained culture medium was centrifuged for 15 minutes at 10000 rpm, and a 29.2-g biomass was obtained with wet weight.

[0052]The result of the lactic-acid-bacteria culture examination investigated in the experiment 11 is shown in Table 7. The wet weight of the lactic-acid-bacteria biomass at the time of using the dry matter for culture media obtained in Example 3 of this invention reached 1.48 times in the contrast which used the yeast extract for culture media so that clearly from the result shown in Table 7. When the wet weight of the lactic-acid-bacteria biomass under culture was investigated temporally and the dry matter for culture media obtained in Example 3 of this

invention is used, In the 28th hour, it turned out after the culture start that the almost same biomass wet weight as the time of the end of culture in the contrast using the yeast extract for culture media (the 40th hour) is already reached. It became clear from this that a desired lactic-acid-bacteria biomass is obtained by culture days shorter than before by using the culture medium for microorganisms obtained from the shochu distillation residual liquor of this invention.

[0053]

[Experiment 12] Using the dry matter for culture media obtained in said Example 3, and the yeast extract for culture media generally used from the former, the culture examination of lactobacillus bifidus was done and the culture medium for microorganisms obtained by this invention was evaluated.

[0054]

[The culture examination by the culture medium of this invention] The dry matter 10g for culture media, the grape sugar 10g, the casein peptone 10g, the meat extract 5g, the dibasic potassium phosphate 3g, L-cysteine hydrochloride 0.5g and the sodium ascorbate 10g which were obtained in Example 3, and 1-ml surface-active agent Tween80 (brand name). It dissolves in 1 l. of water, and is the Bifidobacterium after adjusting the pH to 7. BIFIDAMU JCM1254 was inoculated, the culture medium obtained by cultivating for 48 hours at 37 ** was centrifuged for 15 minutes at 10000 rpm, and the lactobacillus bifidus biomass was obtained.

[The culture examination by the culture medium of contrast] The yeast extract 5g for culture media, the grape sugar 10g, the casein peptone 10g, the meat extract 5g, the dibasic potassium phosphate 3g, L-cysteine hydrochloride 0.5g, the sodium ascorbate 10g, and 1-ml surface-active agent Tween80 (brand name). It dissolves in 1 l. of water, and is the Bifidobacterium after adjusting the pH to 7. BIFIDAMU JCM1254 was inoculated, the culture medium obtained by cultivating for 48 hours at 37 ** was centrifuged for 15 minutes at 10000 rpm, and the lactobacillus bifidus biomass was obtained.

[0055]As a result, the wet weight of the lactobacillus bifidus biomass at the time of using the dry matter for culture media obtained in Example 3 of this invention, when the wet weight of the lactobacillus bifidus biomass obtained in each culture examination was measured reached 1.73 times in the contrast which used the yeast extract for culture media. When the wet weight of the lactobacillus bifidus biomass under culture was investigated temporally and the dry matter for culture media obtained in Example 3 of this invention is used, In the 35th hour, it turned out after the culture start that the almost same biomass wet weight as the time of the end of culture in the contrast using the yeast extract for culture media (the 48th hour) is already reached. It became clear from this that a desired lactobacillus bifidus biomass is obtained by culture days shorter than before by using the culture medium for microorganisms obtained from the shochu distillation residual liquor of this invention. [0056]

[Table 1]

	1次	2次	計
大麦麹	3 t		3 t
燕 麦		10 t	10 t
汲 水	3.6 kL	11.4 kL	15.0 KL

[0057]

[Table 2]

不溶性成分測定試験	
	不溶性成分・湿重量 (g) / 10 g
比較例 1	3.2
実施例 1	0.05以下

[0058]

[Table 3]

着色度測定試験			
	色	吸光度 (430 nm)	吸光度 (480 nm)
比較例 1	濃褐色	3.994	3.000
実施例 1	無色	0.146	0.110

[0059]

[Table 4]

酵母培養試験	
	焼酎酵母・湿重量 (g)
比較例 1	28.0
実施例 1	37.5
増加率 (%)	134

[0060]

[Table 5]

乳酸菌培養試験	
	ラクトバチルス アシドフィラス IFO13951 ^T ・湿重量 (g)
比較例 1	29.4
実施例 1	41.5
増加率 (%)	141

[0061]

[Table 6]

乳酸菌培養試験	
	ラクトバチルス アシドフィラス IFO13951 ^T ・湿重量 (g)
比較例 1	29.7
実施例 2	45.3
増加率 (%)	153

[0062]

[Table 7]

乳酸菌培養試験	
	ラクトバチルス アシドフィラス IFO13951 ^T ・湿重量 (g)
比較例 1	29.2
実施例 3	43.1
増加率 (%)	148

[0063]

[Effect of the Invention] According to the manufacturing method of the culture medium for microorganisms obtained from the shochu distillation residual liquor of this invention, the following effects can be done so as explained in full detail above. Namely, carry out solid liquid separation of the shochu distillation residual liquor which sub** barley in the white-distilled-liquor manufacture used as a raw material, and a part for a fluid is obtained, By filtering a part for this fluid, obtaining clear liquid, condensing this clear liquid, obtaining a concentrate, giving this concentrate to the adsorption treatment using a synthetic adsorbent material, obtaining a

non-adsorptivity fraction, and drying this non-adsorptivity fraction, When this is used as a culture medium for microorganisms, an insoluble in water nature ingredient and a coloring component decrease extremely, and the quantity of the culture object acquired increases remarkably.